

GUARANTEE CERTIFICATE

MODEL:

DATE OF PURCHASE:

OFFICIAL DEALER STAMP:

CASIO COMPUTER CO., LTD.
6-1, Nishi-Shinjuku 2-chome
Shinjuku-ku, Tokyo 163-02, Japan

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CASIO

HPC-510

DI

User's Guide	Warranty Certificate
Petunjuk Pengunaan	Sertifikat garansi
Руководство пользователя	Гарантийный сертификат
Kullanım Kılavuzu	Garanti Belgesi
使用方法	保證書
راهنمای استفاده کنند	گواهی ضمانت
دليل الاستخدام	شهادة ضمان

Features

- Built-In digital compass*
- Prayer Time Search Function
- Prayer Time Alarm
- Hijra Date Function
- Daily Alarm Function

* The digital compass built into this clock can be used as a standard compass or to determine Qibla (prayer direction).

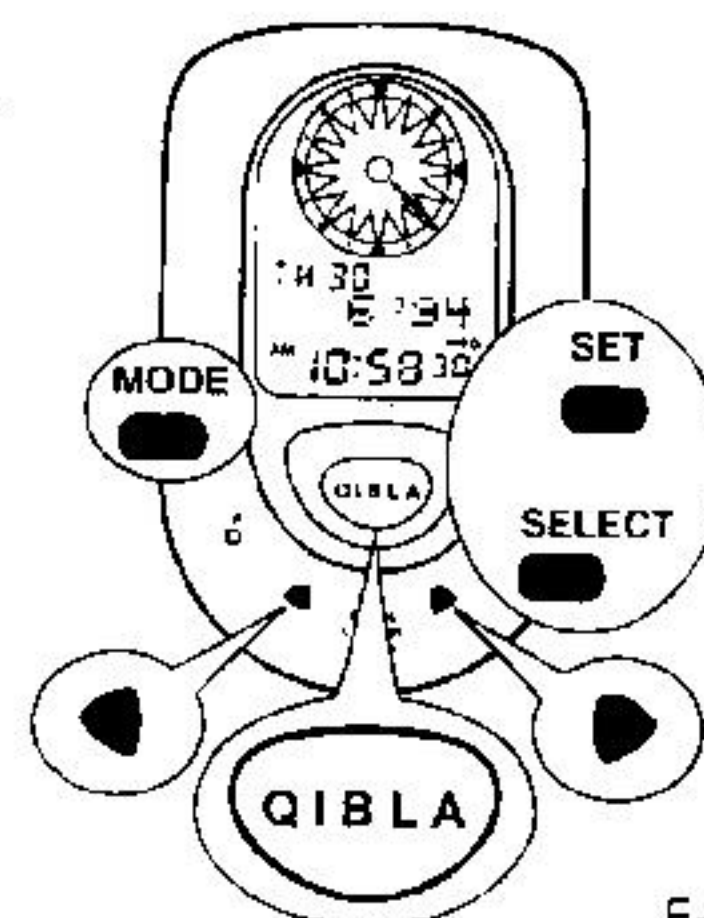
Read this important information first!

- Before you can use the digital compass and Prayer Time Search functions of this clock, you must first input certain data. Be sure to read Part 2 of this manual about the Timekeeping Mode and input the necessary data before using these functions.
- The measurement functions built into this clock are not intended for use in taking measurements that require professional or industrial precision.
- CASIO COMPUTER CO., LTD assumes no responsibility for any loss or claims by third parties which may arise through the use of this clock.

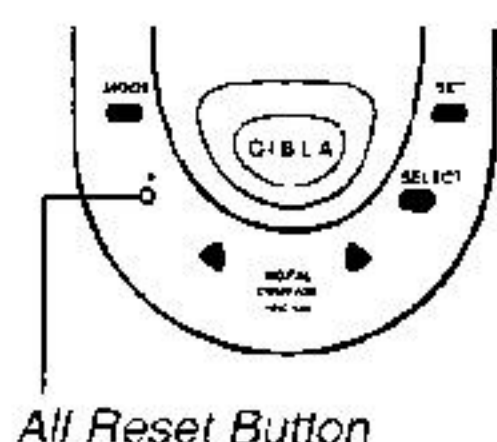
About this manual...

All key operations in text are shown in all-caps bold.

Example: Press **QIBLA** to determine the direction.



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2. Remove both old batteries.
3. Load two new. Make sure the positive (+) is facing up (so you can see it).
4. Replace the battery compartment cover.
5. Press the All Reset Button on the front of the clock.
6. Set the time, date, city data and prayer time calculation method.

Precautions:

- Careless handling of batteries can cause them to burst or leak. Note the following precautions and avoid damage to your clock.
- Be sure that the positive (+) and negative (-) poles of the batteries are facing in the proper direction.
 - Never mix batteries of different types.
 - Never mix old batteries and new ones.
 - Never leave dead batteries in the battery compartment.
 - Remove the batteries if you do not plan to use the clock for long periods.
 - Replace the batteries at least once every 1.5 years, no matter how much the clock is used during that period.
 - Never try to recharge the batteries supplied with the clock.
 - Do not expose the batteries to direct heat, let them become shorted, or try to take it apart.
 - Should a battery leak, clean out the battery compartment of the clock immediately, taking care to avoid letting the battery fluid come into direct contact with your skin.

Keep batteries out of the reach of small children. If swallowed, consult with a physician immediately.

Part 9 Specifications

- Accuracy at normal temperature:** ± 30 seconds per month
- Timekeeping Mode:** Hour, minutes, seconds, am (AM)/pm (PM), year, month, date, day of the week, Hijra month, Hijra date
- Time system:** 12-hour format
- Gregorian calendar system:** Auto-calendar pre-programmed from the year 1990 to 2029
- Hijra calendar system:** Based on 30-day month
- Other:** City Data Setting, Prayer Calculation Method Setting, Prayer Time Display
- Digital Compass:** Qibla Indicator (16 directions) and Digital Compass Mode (16 directions)
- Calibration functions:** bidirectional and northerly
- Warning Indicators:** Abnormal Magnetic Field and Low Battery
- Sensor Precision:** Within $\pm 10^\circ$
- Prayer Time Mode:**
 - Prayer Time: Fajr, Zohr, Asr, Mgrib, Isha
 - Prayer Time Alarms: Fajr, Sunrise, Zohr, Asr, Mgrib, Isha
- Hijra Date Mode:** Hijra Date/Gregorian Date display (specific date)
- Alarm Mode:** Daily alarm, hourly time signal
- Ambient Temperature Range:**
 - Clock: 0°C to 40°C
 - Digital Compass Operations: 10°C to 40°C
- Battery:** Two silver oxide batteries (Type SR927W)
 - Approximately 1.5 years on type SR927W (assuming 5 digital compass operations/day and 110 seconds of alarm operations/day)

Warranty Certificate

THIS WARRANTY CERTIFICATE IS VALID ONLY FOR SERVICE IN THE COUNTRY OF PURCHASE.

Should this timepiece malfunction under normal use, it will be repaired without charge for a period of one year from the date of purchase. If the timepiece requires service within the warranty period, request repair or adjustment at the store where purchased or the authorized CASIO timepiece distributor, presenting the timepiece together with this warranty certificate.

The customer shall not have any claim under this warranty for repair or adjustment expenses if:

- (1) The trouble is caused by improper, rough or careless treatment.
- (2) The trouble is caused by a fire or other natural calamity.
- (3) The trouble is caused by improper repair or adjustment made by anyone other than the authorized CASIO timepiece distributor or its retailers.
- (4) The case, band, glass or battery is damaged or worn.
- (5) This warranty certificate is not presented when requesting service.
- (6) The name and address of the authorized distributor or the retailer are not stamped in the warranty certificate.
- (7) The date of purchase, model name and manufacturing number are not entered in the warranty certificate.

Keistimewaan-keistimewaan

- Kompas digital terpasang*
- Fungsi mencari waktu sholat
- Alarm waktu sholat
- Fungsi tanggal hijriah
- Fungsi alarm sehari-hari

* Kompas digital yang terpasang pada jam ini dapat digunakan sebagai kompas standar atau untuk menentukan arah kiblat (arah sholat).

Bacalah pertama-tama informasi penting ini!

Sebelum anda dapat menggunakan kompas digital dan fungsi-fungsi Pencari Waktu Shalat dari jam ini, pertama-tama anda harus memasukkan data tertentu. Pastikan membaca Pasal 2 dari manual ini mengenai Mode Pencatat Waktu dan masukkan data-data yang diperlukan sebelum menggunakan fungsi-fungsinya.

Fungsi-fungsi pengukuran yang terpasang pada jam ini tidak dimaksudkan untuk penggunaan pada pengukuran yang memerlukan ketelitian profesional atau industri.

CASIO COMPUTER CO., LTD tidak bertanggung jawab atas suatu kehilangan atau tuntutan oleh pihak-pihak ketiga yang mungkin timbul melalui penggunaan jam ini.

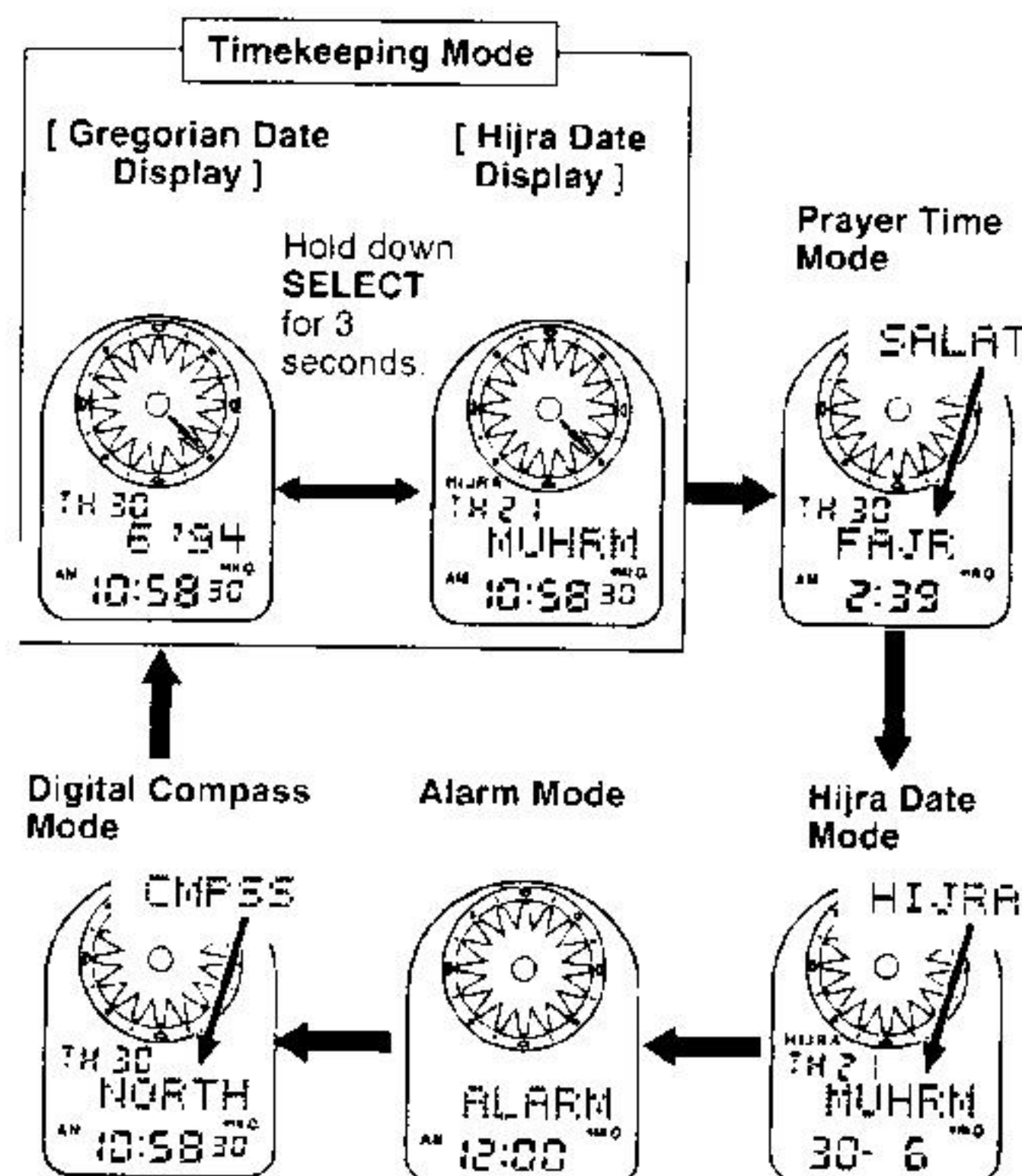
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Part 1 General Guide

- To switch from the Timekeeping Mode to the Prayer Time Mode, hold down **MODE** for about one second. For other modes, simply press **MODE** to change from mode to mode.
- After you perform an operation in any mode, pressing **MODE** returns to the Timekeeping Mode.



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Part 2 Timekeeping Mode

This part of the manual tells you how to set the city data (to tell the clock where you are), the prayer time calculation method,* and the current time and date. Note that the settings you make in the Timekeeping Mode are used by the Digital Compass and Prayer Time function. Make sure you make these settings correctly.

- * There are number of different prayer time calculation methods in use, depending on geographic region. This clock is pre-programmed to calculate prayer times in accordance with the method you select. For details, see "2-2 About prayer time calculation methods."
- In the Timekeeping Mode, you can switch the date display between Hijra style and Gregorian style. For details, see "2-4 About the Timekeeping Mode display."

2-1 About city data...

With the city data, you tell the clock your current location so that it can calculate other data. Be sure to change the city data setting whenever you move from one city to another. City data consist of time differential from Greenwich Mean Time (GMT), latitude, longitude, and directional variation (variation between true north and magnetic north) for the city where you are currently located. You can use either of the two following methods to set city data.

- **Standard Data Input** (see page E-5)
With this method, you simply specify one of 30 pre-programmed city codes, and all other information (based on data for 1990) is input automatically. With this method, however, you must remember to change the time differential from GMT whenever you switch between summer time and standard time. A complete list of the available city codes can be found on page L-3 at the end of this manual.

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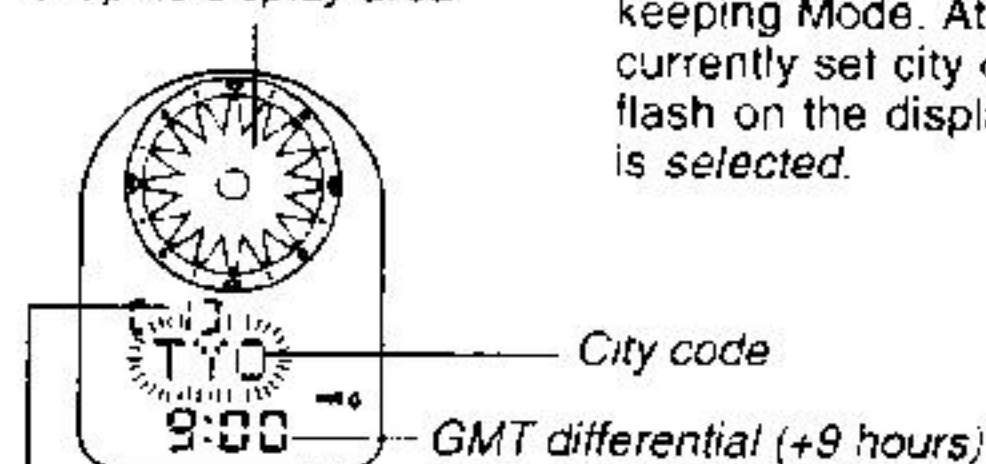
- **Original Data Input** (page E-7)

With this method, you make each of the settings by yourself. There are two methods you can use to preset original data: editing pre-programmed city data or inputting new data. To edit pre-programmed city data, you select one of the pre-programmed city codes and make changes in its data to suit your current location.

To input new data, you must make each setting one-by-one.

To set city data using city codes

Graphic display area



Prayer time calculation method number (page E-10)

1. Press **SET** while in the Timekeeping Mode. At this time, the currently set city code starts to flash on the display because it is selected.
2. While the city code is selected (flashing), press the ◀ or ▶ button to scroll through the 3-letter city codes until the one you want is displayed.
3. After you select your city code, press **SELECT** to advance to the GMT differential setting.

- Pressing **SELECT** causes the GMT differential to start flashing.

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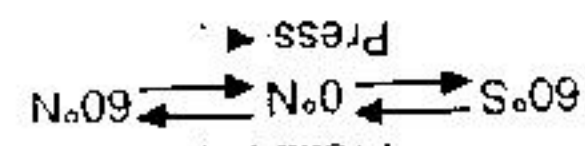
When setting original city data, you can use the City Data List and the Directional Variation Map at the back of this manual (pages L-5 to L-18).

- Prayer time calculation
-
- method number (page E-10)

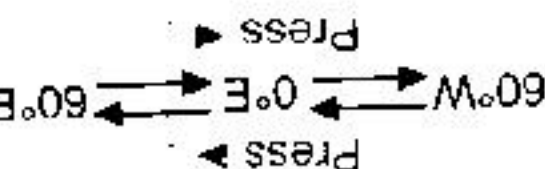
- If you are going to use pre-programmed city data, you should select a city code for a location that is close to the one whose data you want to set.
 - If you are going to input new data, select "—" as the city code.
3. After you select the city code (3-letter city code or "—"), press **SELECT** to advance the GMT differential setting.
 4. Press **▶** to increase the time differential or **▶** to decrease it. Pressing **▶** and **▶** changes the time differential in 15-minute increments.
 - The hours setting changes automatically whenever a change in the minutes settings increases or decreases past 00.
 - Holding down **▶** or **▶** changes the time differential at high speed.
 - You can set the GMT differential within the range of -11 hours (-11:00) to +13 hours +5 minutes (+13:45).

4. If you want to change the GMT differential setting (to adjust for the 1-hour change for summer time), press $\blacktriangle$ to increase the time differential or $\blacktriangleright$ to decrease it.
- If you do not want to change the GMT differential setting, skip this step and proceed to step 5.
- Pressing $\blacktriangle$ and $\blacktriangleright$ changes the time differential in 15-minute increments.
- The hours setting changes automatically whenever a change in the minutes settings increases or decreases past 00.
- You can set the GMT differential within the range of -11 hours to +13 hours 45 minutes.
5. After you finish making your setting, press **SET** twice to return to the Timekeeping Mode.
- After you change the setting in the above procedure, the clock needs a bit of time to calculate certain information. During this calculation, the pattern in the graphic display moves. Wait until this display stops moving before you try to set any further data.
- If you do not operate any button for a few minutes while a selection is flashing, the flashing stops and the clock automatically goes back to the Timekeeping Mode.
- After you change the GMT differential for summer time, the city code (which is displayed with the city data when setting the prayer time calculation method) is marked with a $\clubsuit$ to indicate that its data has been changed.

6. Use **►** and **◄** to change the latitude within the range shown in the illustration. Holding down either button changes the setting at high speed.



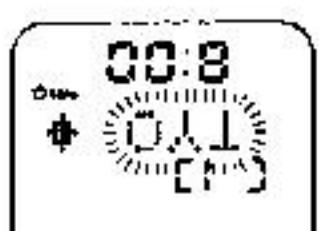
- Longitude



-
- The diagram shows a clock face with two hands. One hand points to '3:00' and is labeled 'Clock value'. The other hand points to '4:00' and is labeled 'Directional variation'.

10. Use ► and ◀ to change the directional variation setting in the range shown in the illustration. Holding down either button changes the setting at high speed.

- Note here that the prayer time calculation method (see 2-2 About prayer time calculation methods) is also considered to be part of the pre-programmed data. Because of this, "✚" is shown with the city code if the prayer time calculation method has been changed, also.
- Whenever you change to another city code from a city code whose pre-programmed data has been changed, the changed data is automatically reset to their initial (unchanged) settings. You have to make the changes again if you wish to return to the original city code.
- New settings that you make (using " -- " as the city code) are stored in memory until you change them. If you change from " -- " to another city code, the settings for " -- " are retained



11. After finish setting your city data, press **SEL** twice to return to the Timekeeping Mode.

Methods that are used to determine player times (especially Fajr, Asr, and Isha) differ somewhat between countries and regions. This clock comes with a total of seven built-in prayer time calculation methods that conform with various geographical areas around the world. In addition, you can also set your own calculation method for calculation of Fajr, Asr, and Isha.

Prayer Time Calculation Methods

No.	Type of Calculation Methods			Applicable Areas
	FAJR	ASR	ISHA	
1	18.0°	-- 1	17.0°	Europe, Turkey, Far East, etc.
2	18.0°	-- 1	18.0°	Kuwait, Iran, etc.
3	18.0°	-- 2	18.0°	Afghanistan, Pakistan, India, Bangladesh, etc.
4	19.0°	-- 1	-- 2	Saudi Arabia
5	19.5°	-- 1	-- 1	Bahrain, Qatar, Oman, UAE, etc.
6	20.0°	-- 1	18.0°	Africa, Lebanon, Jordan, Syria, Iraq, Yemen, continental United States, Indonesia, Malaysia, Singapore, etc.
7	-- 1	-- 1	-- 1	England
0	15.0°	-- 1	15.0°	(User programmable)

- Numbers 1 through 7 are pre-programmed calculation methods, while 0 is reserved for input of a user calculation method. These numbers are used to specify the calculation method that you want.
- The degree values in the above table (such as : 18.0°) indicate the angle of the sun below the horizon. The values -- 1 and -- 2 have the following meanings.

FAJR -- 1 : 90 minutes before sunrise

-- 2 : 120 minutes before sunrise

ASR -- 1 : Shadow length equal that produced by objects

-- 2 : Shadow length double that produced by objects

ISHA -- 1 : 90 minutes after sunset

-- 2 : 90 minutes after sunset, and 120 minutes after sunset during Ramadan

The -- 1 or -- 2 setting of No. 0 can be changed when making its angle of sun below the horizon settings.

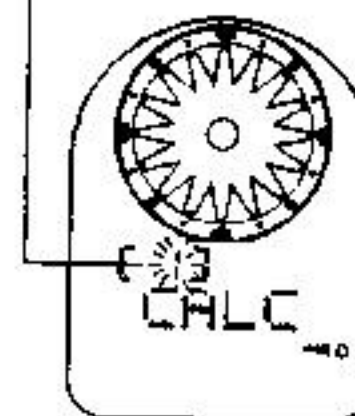
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- For the angle of sun below horizon values, one degree of angular differential is equivalent to a time differential of approximately four minutes.
- At latitudes greater than 45° (north or south), this clock extrapolates Fajr and Isha prayer times based on the proportion of night time, and predawn light/twilight at 45° (north or south).
- This clock's pre-programmed prayer calculation methods were carefully selected to provide the widest possible applicability. Note, however, that there are still other calculation methods and variations.

To set a prayer calculation method Important!

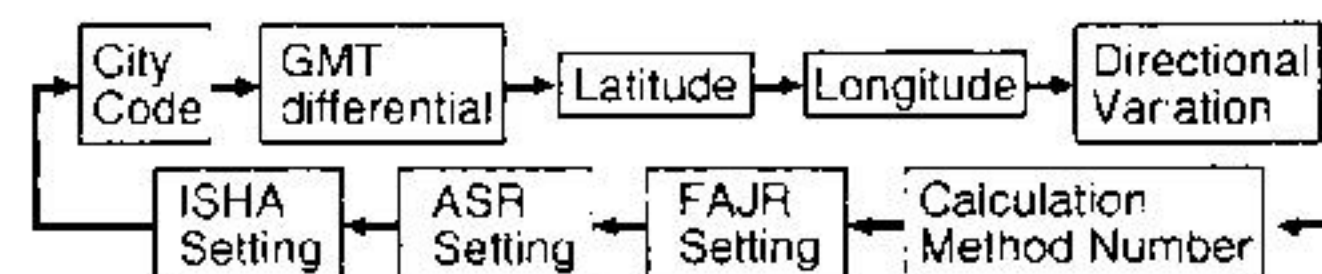
See "Prayer Time Calculation Methods" on page E-10 before making the following setting.

Prayer time calculation method number



- Press **SET** while in the Time-keeping Mode. At this time, the currently set city code starts to flash on the display because it is selected.
- Press **SELECT** five times to advance to the prayer time calculation setting screen. In this display, the prayer time calculation method number is flashing.

- Each time you press **SELECT**, the display changes in the sequence noted below. If you accidentally go past the prayer time calculation method setting screen, use **SELECT** to go back through the sequence until it appears again.



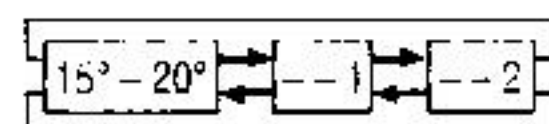
- If you have already set a pre-programmed city code, the corresponding prayer time calculation method number appears flashing on the display. Press **SELECT** to check the settings for FAJR, ASR, and ISHA. If they are correct, proceed with step 10 below. If the settings are not correct, proceed with step 3 to change them.

- Press **◀** to decrease the prayer time method number and **▶** to increase it.

- If you want to use one of the pre-programmed prayer time calculation methods, select its number and proceed with step 10 below. If you want to make your own settings, select number 0 and proceed with step 4.



Press **▶**.



Press **◀**.

- If you selected number 0 in step 3, press **SELECT** to display the FAJR setting screen.

- Use **◀** and **▶** to change the FAJR setting within the range shown in the illustration. Holding down either button changes the setting at high speed.

- With the "15° - 20°" setting, you can make the setting in units of 0.5 degrees.

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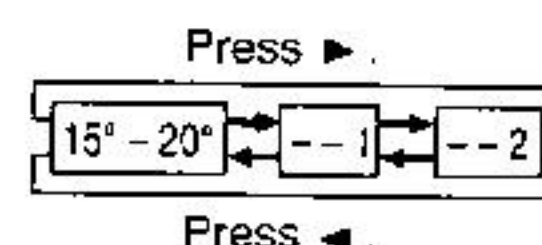


- After you set the FAJR, press **SELECT** to advance to the ASR setting.

- Press **◀** or **▶** to switch the ASR setting between "-- 1" and "-- 2".



- After you set the ASR, press **SELECT** to advance to the ISHA setting.



Press **◀**.

- Use **◀** and **▶** to change the ISHA setting within the range shown in the illustration. Holding down either button changes the setting at high speed.

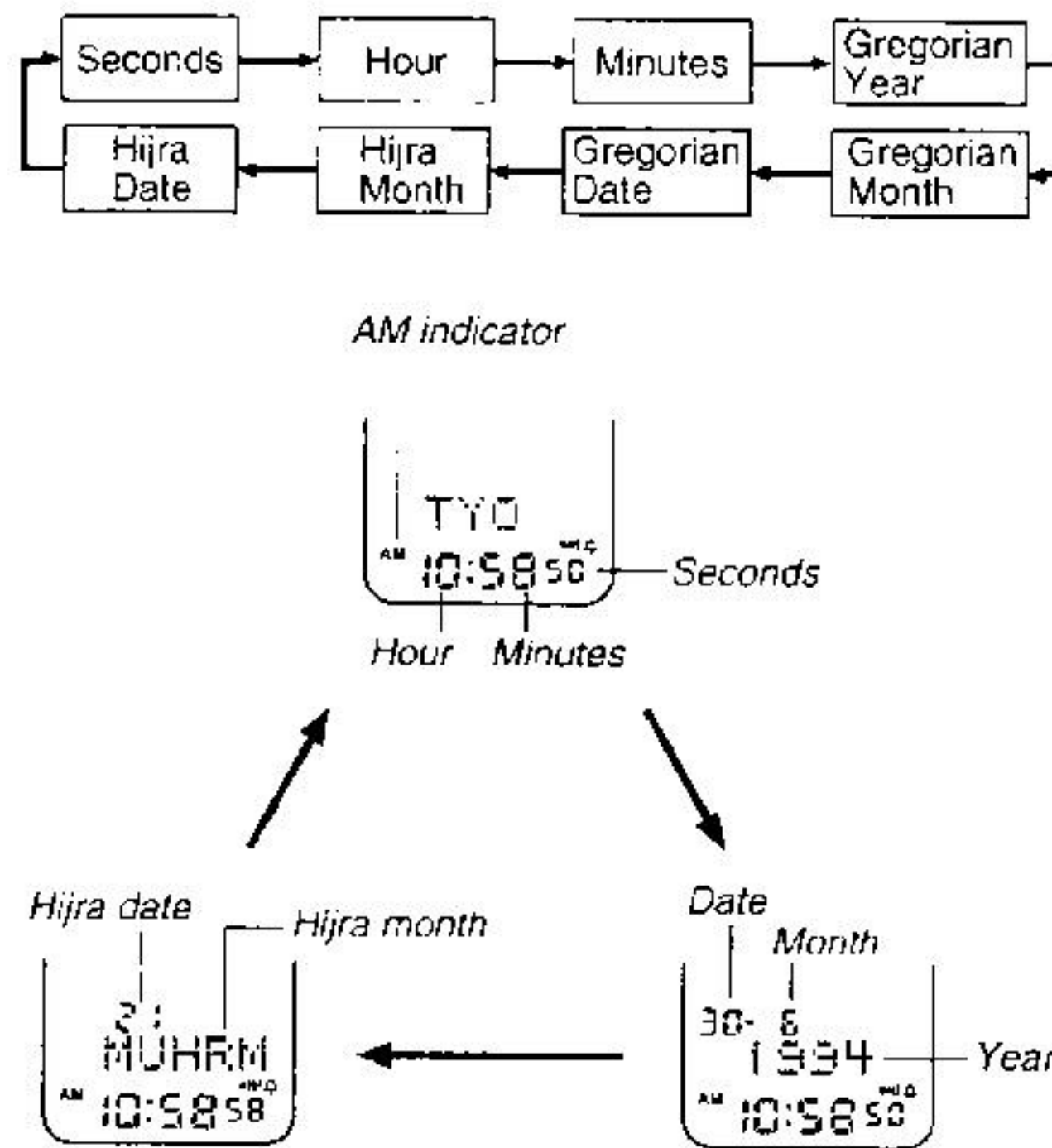
- With the "15° - 20°" setting, you can make the setting in units of 0.5 degrees.

- After you finish setting the prayer time calculation method, press **SET** twice to return to the Timekeeping Mode.

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2-3 To set the time and date

1. Press **SET** twice while in the Timekeeping Mode. The seconds digits start to flash on the display because they are *selected*.
2. Press **SELECT** to change the selection in the following sequence.



3. While the seconds digits are selected (flashing), press **▶** to reset them to "00". If you press **▶** while the seconds count is in the range of 30 to 59, the seconds are reset to "00" and 1 is added to the minutes. If the seconds count is in the range of 00 to 29, the minutes count is unchanged.
4. While any other setting (besides seconds) is selected (flashing), press **▶** to increase the setting or **◀** to decrease it. Holding down either button changes the setting at high speed.
- The digital time is always displayed in 12-hour format.
5. After you set the time and date, press **SET** to return to the Timekeeping Mode.
- The day of the week is automatically set in accordance with the Gregorian Date setting.
- The Gregorian Date can be set within the range of January 1, 1990 to December 31, 2029.

Important!

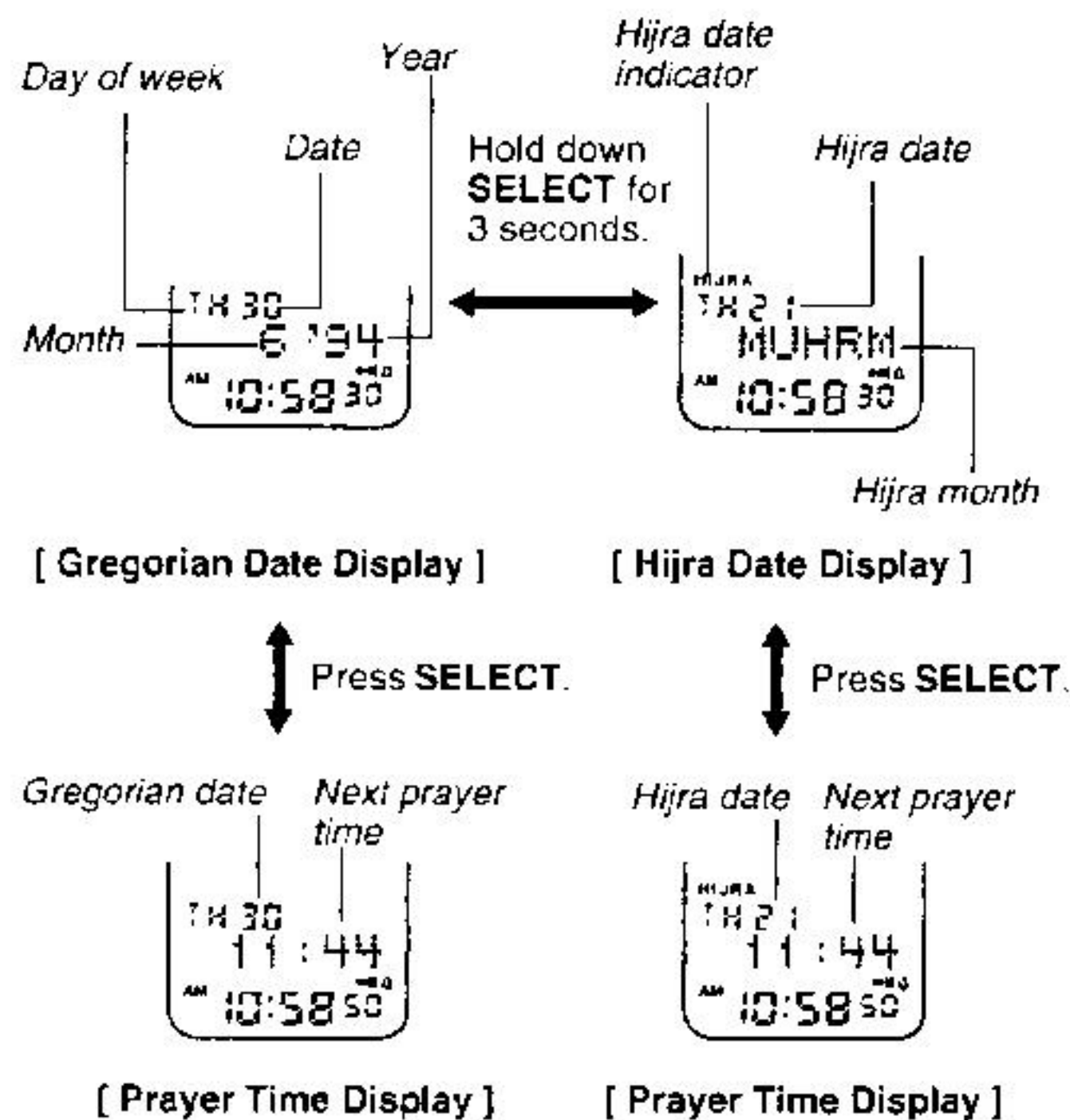
This clock uses a 30-day cycle to calculate the Hijra months. Because of this, the Hijra date shown by this clock may differ from the actual date. When this happens, use time/date setting procedure described above to change the date to its correct setting. Also note that the clock uses midnight as the point for the change of date.

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2-4 About the Timekeeping Mode display

You can switch the Timekeeping Mode display to show the Hijra date, Gregorian date, or prayer times as illustrated below.



Important!

- The date display (Hijra or Gregorian) you select here determines the format for the date that appears in other modes. If you select the Hijra date display, for example, the Hijra date format is used in the Prayer Time Mode as well. Note also that a Hijra date indicator appears on the display while the Hijra date display is selected.
- Whenever the Prayer Time Display is selected, the next sequential prayer time (Fajr, Zohr, Asr, Mgrib, Isha) is indicated on the display.
- AM and PM is not indicated on the Prayer Time Display.
- The next prayer time indicated on the Prayer Time Display changes one minute after the indicated prayer time is reached.
- The next prayer time is indicated for the current date only. Because of this, the Isha prayer time remains on the display even after Isha is passed. The next prayer time will change to Fajr after midnight.

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E-17

Part 3 Determining the Direction to Qibla

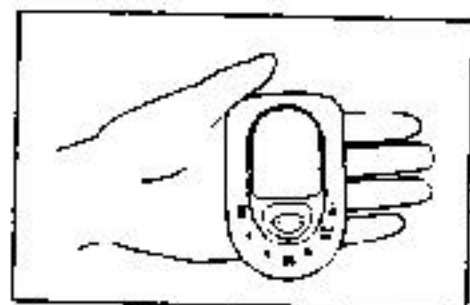
This part of the manual tells you how to determine Qibla. It also contains information about the Qibla value.

Important!

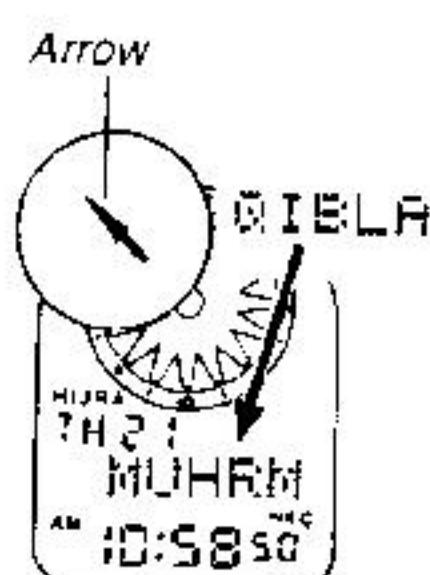
Be sure to keep this clock away from any sources of strong magnetism whenever using the digital compass to determining directions or Qibla. Also note that proper digital compass operation is impossible while inside a motor vehicle. For details, see "7-2 Digital Compass Precautions" on page E-27 of this manual.

3-1 Determining Qibla

1. Set your city data.
2. Position the clock so that it is horizontal in relation to the horizon.



- Digital compass operation while the clock is not horizontal can produce erroneous results.



E-18

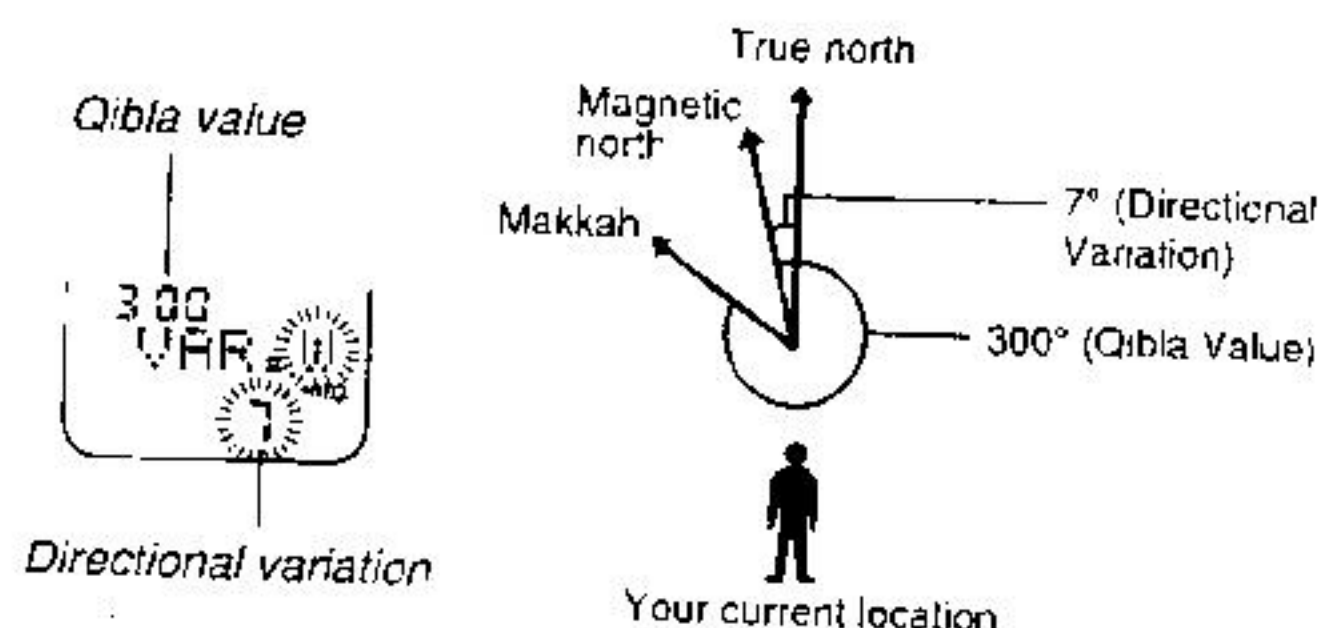
3. While in any mode besides the Digital Compass Mode, press **QIBLA** to start the Qibla operation.

- If the clock is in the Digital Compass Mode, press **MODE** to change to another mode before starting the Qibla operation.
- "QIBLA" appears on the display, and soon an arrow pointing in the direction of QIBLA appears in the graphic display area.

- The arrow remains on the display for about three minutes after you perform the above operation.

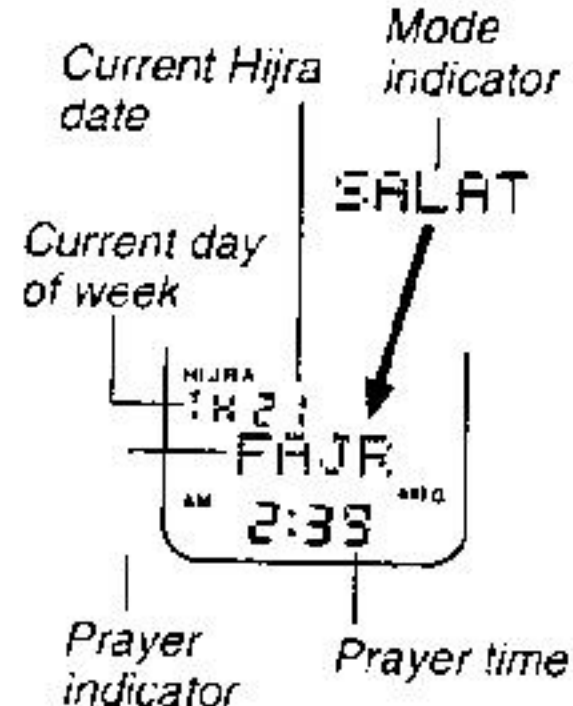
3-2 About Qibla values...

The Qibla value represents the clockwise angle formed between a line starting from your current location extending to magnetic north, and a line starting from your current location reaching Makkah.



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Part 4 Prayer Time Mode



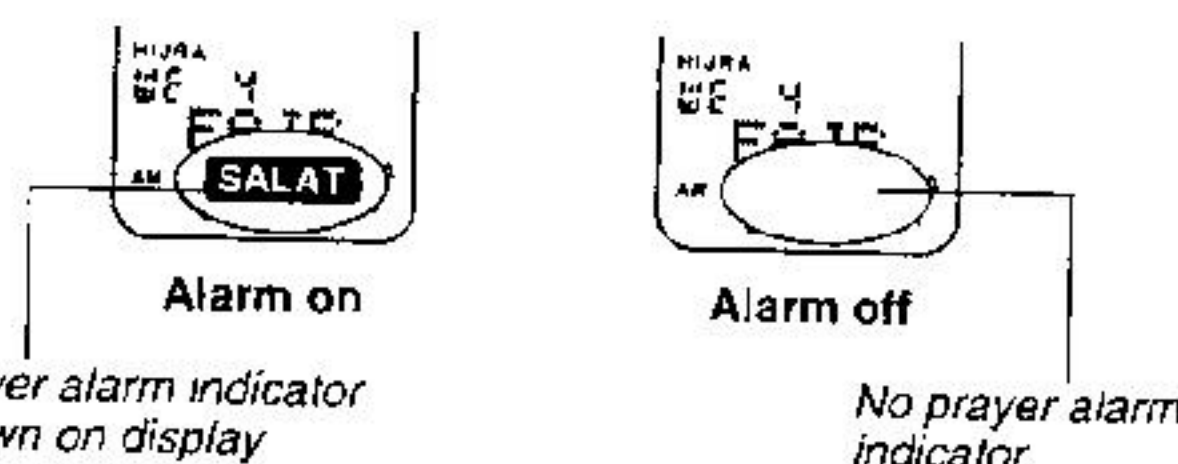
The Prayer Time Mode lets you recall the prayer times throughout the day. A Prayer Time Alarm (which can be switched on and off) sounds for 10 seconds when each prayer time arrives. Press any button to stop the alarm after it starts to sound.

To view Prayer Time Mode data

While in the Prayer Time Mode, use ◀ and ▶ to scroll through the different prayer times. Each prayer time is accompanied by a prayer indicator that tells you what prayer time is displayed.

4-2 To switch the prayer alarm on and off

1. Enter the Prayer Time Mode and use ◀ and ▶ to display the prayer time whose alarm you want to switch on or off.
2. While the prayer time you want is displayed, press **SELECT** to switch its prayer alarm on and off.



4-1 About prayer times...

Prayer Indicator	Prayer Time
FAJR (Fajr)	Fajr start time
RISE*	Sunrise time
ZOHR (Zohr)	Zohr start time
ASR (Asr)	Asr start time
MGRB (Mgrib)	Mgrib start time
ISHA (Isha)	Isha start time

* RISE (Sunrise time) does not indicate a prayer time.

Prayer times are calculated automatically in accordance with the time, date, city data, and prayer time calculation method you set in the Timekeeping Mode. This, of course, means that you should always make sure that your Timekeeping Mode data is set correctly.

- You can individually switch the alarms on and off.
- If any prayer time indicator is on, the prayer alarm indicator is shown on the display when you change to another mode.

4-3 Prayer Time Precautions

- Compared to astronomical calculations, the accuracy of the prayer time values produced by this clock is within ± 5 minutes.
- When you move from one region to another, be sure that you correctly set the Timekeeping Mode data (city data, prayer time calculation method, and current time) for the region you are moving into.

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- In Europe, the United States, and other areas that use daylight saving time (summer time), be sure to make the proper adjustment in the current time and the GMT differential to allow for standard time or daylight saving time (standard time +1 hour).

Example:

Paris: GMT +1 (standard time) or GMT +2 (daylight saving time)
New York: GMT -5 (standard time) or GMT -4 (daylight saving time)

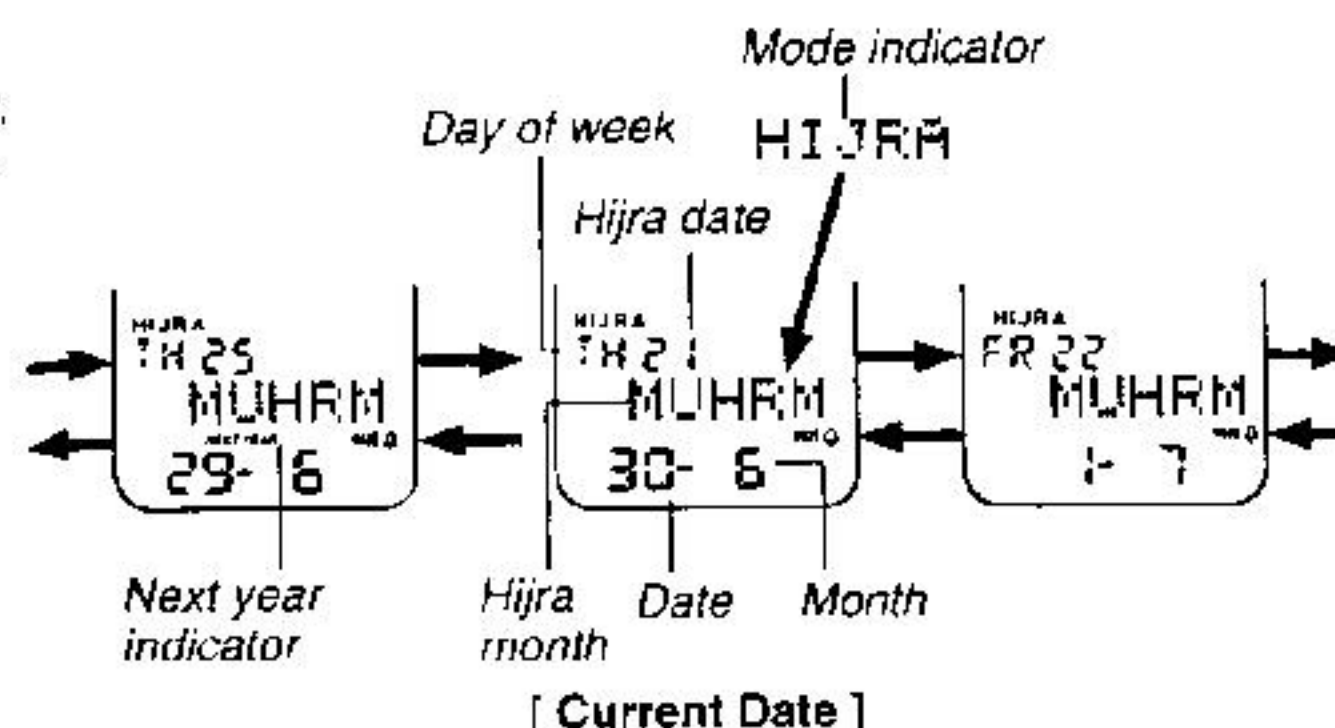
Remember that if you fail to make the above settings correctly, the prayer times cannot be calculated and displayed properly.

Part 5 Hijra Date Mode

In the Hijra Date Mode, you can scroll through dates to display both the Hijra date and the Gregorian date.

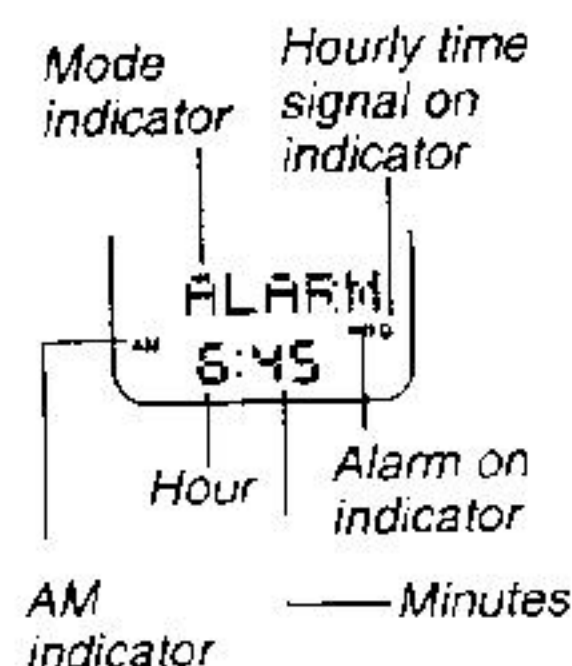
To display a specific date

While in the Hijra Date Mode, use ► to advance the date (Timekeeping Mode date) and ◀ to move back. Holding down either button changes the date at high speed.



- When you enter the Hijra Date Mode from another mode, the display automatically changes to the current Hijra and Gregorian dates, in accordance with the Timekeeping Mode setting.
- This clock uses a 30-day cycle to calculate the Hijra months. Because of this, the Hijra date shown by this clock may differ from the actual date.
- With the above operation, you can advance the date up to one year. If the current Timekeeping Mode Gregorian date is June 30, 1994 for example, you can advance up to June 29, 1995.
- Note that the message "NEXT YEAR" appears on the display when you advance the date into the next year.

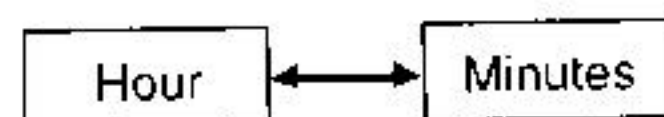
Part 6 Alarm Mode



When the Daily Alarm is switched on, the alarm sounds for 60 seconds at the preset time each day. Press any button to stop the alarm after it starts to sound. When the Hourly Time Signal is switched on, the clock beeps every hour on the hour.

To set the alarm time

1. Press **SET** while in the Alarm Mode. The hour digits flash on the display because they are selected.
- At this time the Daily Alarm is switched on automatically.
2. Press **SELECT** to change the selection in the following sequence.

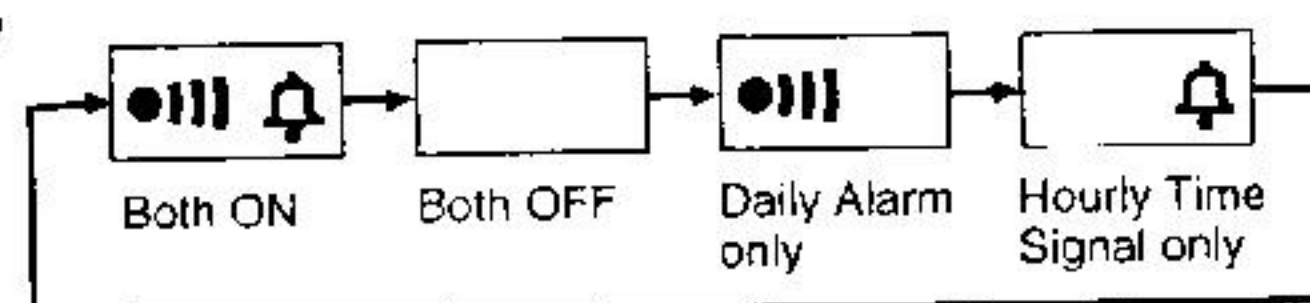


3. Press ► to increase the selected digits and ◀ to decrease them. Holding down either button changes the selection at high speed.
- The digital time is always displayed in 12-hour format. Take care to set the alarm time correctly as morning (AM) or afternoon (PM).
4. After you set the alarm time, press **SET** to return to the Alarm Mode.

To switch the Daily Alarm and Hourly Time Signal on and off

Press **SELECT** while in the Alarm Mode to change the status of the Daily Alarm and Hourly Time Signal in the following sequence.

[Alarm ON indicator/Hourly Time Signal ON indicator]



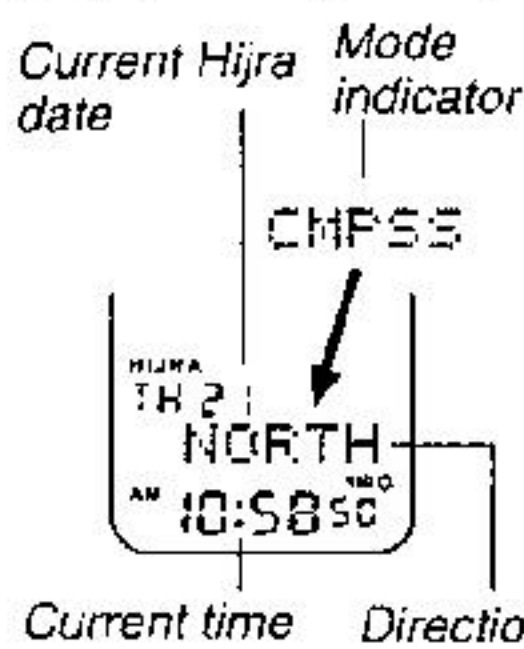
About the alarm sounds

This clock has three types of alarms: Prayer Time Alarm, Daily Alarm, and Hourly Time Signal. Each alarm has a different type of sound so you can tell them apart. Note that the alarms have the following priority sequence whenever they are set to sound at the same time.

1. Prayer Time Alarm
2. Daily Alarm
3. Hourly Time Signal

- This means that if the Daily Alarm and Prayer Time Alarm are set to sound at the same time, only the Prayer Time Alarm sounds.

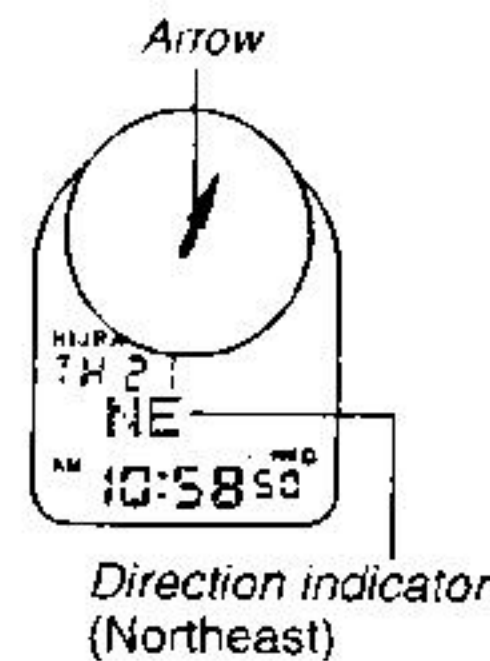
Part 7 Digital Compass Mode



In the Digital Compass Mode, the clock points to one of 16 directions selected by you.

7-1 To use the digital compass

1. While in the Digital Compass Mode, use ◀ and ▶ to display the indicator that specifies the direction you want to point to.



3. Press **QIBLA** to start the compass operation.
 - After a few seconds the arrow on the display points in the direction you selected in step 1. This arrow remains on the display for about three minutes.
 - You can repeat steps 1 through 3 as many times as you like.

From NORTH to NNW
 ↑
 Press ◀
 Press ▶
 ↓
 From NORTH to NNE

Indicator	Direction	Indicator	Direction
NORTH	North	SOUTH	South
NNE	North-northeast	SSW	South-southwest
NE	Northeast	SW	Southwest
ENE	East-northeast	WSW	West-southwest
EAST	East	WEST	West
ESE	East-southeast	WNW	West-northwest
SE	Southeast	NW	Northwest
SSE	South-southeast	NNW	North-northwest

7-2 Digital Compass Precautions

The following describes precautions you should observe when performing a digital compass operation. Note that the term digital compass operation in this manual refers to Digital Compass Mode operations and to the Qibla operation.

This clock features a built-in magnetic bearing sensor that detects terrestrial magnetism. This means that the northern direction indicated by this clock is magnetic north, which is somewhat different from true polar north. The magnetic north pole is located in northern Canada, while the magnetic south pole is in southern Australia. The difference between true north and magnetic north is expressed in degrees, and it is called the *directional variance*. The map on page L-17 at the end of this manual shows the directional variance for points around the globe.

2. Position the clock so that it is horizontal in relation to the horizon.
 - Note that taking a measurement while the clock is not horizontal (in relation to the horizon) can result in large measurement error.
- Note that the directional variance as measured with magnetic compasses tends to be greater as one gets closer to either of the magnetic poles. You should also remember that some maps indicate true north (instead of magnetic north), and so you should make allowance when using such maps with this clock.

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Location



- Using a digital compass operation when you are near a source of strong magnetism can cause large errors in readings. Because of this you should avoid using a digital compass operation while in the vicinity of the following types of objects: permanent magnets (magnetic necklaces, etc.), concentrations of metal (metal doors, lockers, etc.), high tension wires, aerial wires, household appliances (TVs, personal computers, washing machines, freezers, etc.).

- Accurate direction measurements are impossible while in a train, boat, air plane, etc.
- Accurate measurements are also impossible indoors, especially inside ferroconcrete structures. This is because the metal framework of such structures picks up magnetism from appliances, etc.

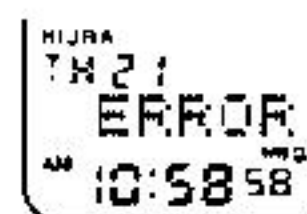
Storage

- The precision of the digital compass may deteriorate if the clock becomes magnetized. Because of this, you should be sure to store the clock away from magnets or any other sources of strong magnetism, including: permanent magnets (magnetic necklaces, etc.) and household appliances (TVs, personal computers, washing machines, freezers, etc.).
- Whenever you suspect that the clock may have become magnetized, perform one of the calibration procedures on page E-30.

7-3 Warning Indicators

Warning indicators (message) appear whenever any of the conditions described below occurs.

Abnormal Magnetic Field Indicator



This indicator appears on the display whenever the digital compass has a problem obtaining a correct reading. This condition could indicate that the clock is within a very high magnetic field, and so you should try moving to another location. Also see "7-2 Digital Compass Precautions" for further information on conditions that cause errors.

Low Battery Indicator



This message indicates battery power is too low to perform a digital compass operation. It appears whenever battery power drops below a certain level, or when you try to perform a digital compass operation under cold conditions (see Part 9 Specifications on page E-35).

If the BATT message appears because of use under cold conditions, it should clear (and normal operation should return) after the clock is brought back to normal temperature. If battery power is low (indicated when BATT appears under normal temperatures), you should have the battery replaced as soon as possible.

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7-4 Calibrating the magnetic sensor

Whenever you suspect that the readings produced by a digital compass operation are wrong, you should calibrate it. You can use either one of two calibration procedures: *bidirectional calibration* or *northerly calibration*.

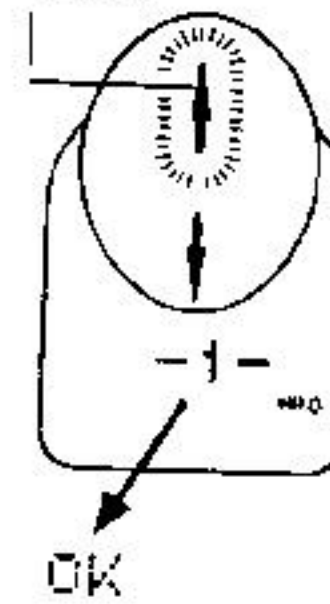
You should use bidirectional calibration when you want to calibrate the digital compass to operate within an area exposed to magnetic force. This type of calibration should be employed if the clock becomes magnetized for any reason. With northerly calibration, you "teach" the clock which way is magnetic north (which you have to determine with another compass or some other means).

Important!

- If you want to perform both bidirectional and northerly calibration, be sure to perform bidirectional calibration first and then perform northerly calibration. This is necessary because bidirectional calibration cancels any previously set northerly calibration setting.
- If you do not perform any button operation for two or three minutes while either calibration procedure is in progress (while the calibration direction indicator is flashing at the 12 o'clock position), the clock automatically returns to the Digital Compass Mode.
- The more correctly you perform bidirectional calibration, the better the accuracy of your digital compass readouts. You should perform bidirectional calibration whenever you change environments where you perform digital compass operation and whenever you feel that digital compass operations are producing incorrect readings.

To perform bidirectional calibration

Calibration direction indicator



1. While in the Digital Compass Mode, press **SET** to start the bidirectional calibration procedure.
 - At this time, the display changes to show "- 1 -" and the calibration direction indicator flashes at the 12 o'clock position to indicate that the clock is ready to calibrate the first direction.
2. Place the clock on a level surface, and press **QIBLA** to calibrate the first direction.

When the calibration procedure is complete, the message "OK" appears in the display. This shortly changes to "- 2 -" and the calibration direction indicator flashes at the 6 o'clock position to indicate that the clock is ready for the second direction.

3. Rotate the clock 180 degrees.
4. Press **QIBLA** again to calibrate the second direction.
 - When the calibration procedure is complete, the message "OK" appears in the display. After a short while, the clock automatically returns to the Digital Compass Mode.

Precautions about bidirectional calibration

- You can use any two opposing directions for bidirectional calibration. You must, however, make sure that they are 180 degrees opposite each other. Remember that if you perform the procedure incorrectly, you will get wrong readings from digital compass operations.

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- Do not move the clock during one to two seconds (from the point you press **QIBLA**, up to the point that "OK" appears on the display) that the calibration of each direction is in progress. If you do, the Abnormal Magnetic Field Indicator "ERROR" appears on the display. When this happens, restart the bidirectional calibration procedure from the beginning.
- The appearance of "ERROR" during bidirectional calibration can also be caused by local interference. Move to another location and try the bidirectional calibration procedure again.
- You should perform bidirectional calibration in an environment that is the same as that where you plan to be performing digital compass operations. If you plan to use it in an open field, for example, calibrate in an open field.

Part 8 User Maintenance

Care of Your Clock

Since the clock contains precise electronic components, never attempt to disassemble it.

- Do not subject the clock to strong impact, temperature extremes or direct sunlight.

Clean the exterior of the clock with a soft dry cloth, or with a soft cloth moistened with a weak solution of water and a neutral detergent.

Never clean the clock using benzine, thinner, or any other volatile agent.

- This clock is not water resistant. Never let it get wet.

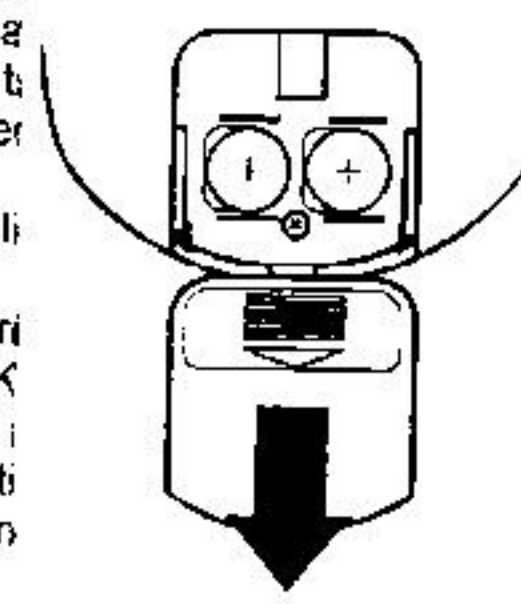
Battery Replacement

This clock is powered by two SR927W silver oxide batteries. Replace the batteries whenever the display of the clock becomes dim or difficult to read, or when the BATT message remains on the display.

To replace batteries



3. Place the clock on a level surface, and position it so that its 12 o'clock position points magnetic north (as measured with another compass).
4. Press **QIBLA** to start the calibration operation.
 - When the calibration procedure is complete, the message "OK" appears on the display. After a short while, the clock automatically returns to the Digital Compass Mode.



[Back Side]

Important!

Whenever you replace the batteries, all settings including the time, date, city data, and prayer time calculation method are cleared. Be sure to always keep written records of important data.

1. Open the battery compartment cover on the back of the clock by sliding it in the direction indicated by the arrow.

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